

**SENSOR FOR TRANSCUTANEOUS MEASUREMENT  
OF VASCULAR ACCESS BLOOD FLOW**

Abstract of the Invention

An optical sensor includes a sensing pair of complementary emitter and detector elements for measuring the bulk absorptivity ( $\alpha$ ) of an area parallel to and including a hemodialysis access site, and a normalizing pair of complementary emitter and detector elements for measuring the absorptivity ( $\alpha_0$ ) of the tissue itself perpendicular to the access site. The pairs of emitter and detector elements define two lines at right angles to each other, and one of the pairs lies to one side of the line defined by the other of the pairs, such that the two pairs of emitter and detector elements form a "T" shape. Indicator dilution techniques are used to measure vascular access flow rates during routine hemodialysis, using the sensor.